a) digesting the cells containing nucleic acids, removing cell debris and thereafter subjecting the nucleic acids to anion exchange against an anion exchanger in a first buffer solution, which has a low ionic strength,

b) desorbing the nucleic acids from the anion exchanger by applying a second buffer solution, which has a higher ionic strength than the first buffer solution, effecting purified nucleic acids in the second buffer solution; and

ii) in a second separation/purification stage,

c) adsorbing the separation/purified nucleic acids in the second buffer solution onto the surface of a mineral support material, optionally in the presence of lower alcohols, poly(ethylene glycol), or a mixture thereof, and

d) desorbing the nucleic acids from the mineral support material by applying an eluant, wherein the eluant is water or a third buffer solution, which has an ionic strength lower than the second buffer solution, effecting twice-purified nucleic acids.

**102.** The process according to claim 101, wherein the stages i) and ii) are carried out in immediate succession.

**103.** The process according to claim 101, further comprising the step of, prior to the digesting step, subjecting the cells to centrifugation or filtration in order to remove undissolved components.

**104.** The process according to claim 101 further comprising, between the steps a) and b), one or more washing steps by applying a fourth buffer solution, which has a low ionic strength, optionally increasing ionic strength per washing step.

**105.** The process according to claim 101 further comprising, between the steps c) and d), one or more washing steps by applying a fifth buffer solution, which has an ionic strength higher than the first buffer solution.

**106.** The process according to claim 101 further comprising, between the steps c) and d), at least one washing step by applying an aqueous alcoholic solution.

**107.** The process according to claim 101 further comprising, between the steps c) and d), a washing step by applying a solution having an ionic strength corresponding to a 1.5 molar sodium perchlorate solution and a pH of 5.

**108.** The process according to claim 101, wherein the isolated and purified nucleic acid has from 10 nucleotides to 200,000 nucleotides.

**109.** The process according to claim 101, wherein the mineral support material is silica gel, glass, zeolite, aluminum oxide, titanium dioxide, zirconium dioxide, kaolin, or diatomacae.

110. The process according to claim 101, wherein the anion exchanger has a porous or non-porous matrix having a particle size of from 1 to 250 μm.

111. The process according to claim 101, wherein the anion exchanger has a porous or non-porous matrix having a particle size of from 10 to 30 μm.

112. The process according to claim 101, wherein the mineral support is silica gel, in suspension, having a particle size of from 1 to 250 μm.

113. The process according to claim 101, wherein the mineral support is silica gel, in suspension, having a particle size of from 1 to 5 μm.

114. The process according to claim 101, wherein the anion exchanger has a particle size of from 1 to 250 μm and a pore diameter of from 1 to 2,500 nm.

115. The process according to claim 101, wherein the anion exchanger has a particle size of from 10 to 100 μm and a pore diameter of from 1 to 2,500 nm.

116. The process according to claim 101, wherein the anion exchanger has a particle size of from 1 to 250 μm and a pore diameter of from 100 to 400 nm.

117. The process of claim 106, wherein the aqueous alcoholic solution includes from 1 to 7 M sodium perchlorate, from 1 to 7 M guanidine-HCl, from 1 to 5 M sodium chloride, from 1 to 6 M sodium iodide, and 1 M sodium chloride in 20% ethanol, propanol, isopropanol, butanol, poly(ethylene glycol), or mixture thereof.